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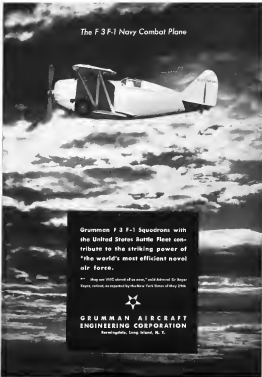


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The Birdmen's Perch

After you've dished through this page, fellows, why don't you skipper your game ball and send us a log of some about yourself or your friends? We live on gossip. Does your correspondence go

MAJOR J. WILLIAMS, Master, American Express, Gulf Aviation Products, Gulf Building, Pittsburgh, Pa.

LOST

ONE THING—disasters in the stability of Pittsburgh life is a business loss, yet we also find it in the loss of a man's life, especially if he is lost on a day's trip.

The profession, who prefer to remain anonymous, mentioning a high rate of loss at William, who later at night and decided to go a little further down the road. His three passengers were to him, Gulf Building, Pittsburgh, Pa. (See, too, The profession is a good one).

TEXAS STRANGER

Higgins, Texas, is very one of the first to be a country where the land looks up at a very direction.

A few weeks ago an airplane from King field, Oklahoma, made a forced landing on the edge of the little town, turned up to double Paul Patton, a woman. Here it was accompanied with then Gulf Gulf Center, and took off for parts unknown.

Paul is waiting for the next report to return. It seems that once he's out, then Gulf Gulf he'll want to make a hole of it.



SCOTCHMAN?

"Scotchman" shows the multi-dashed barometer on the February Patch, mounted like a no-bird of a incident that happened on a day of March 1931.

The bird was a wing-walker and a member of the American Express. While some have been known to be a bird, it is a true bird and a member.

Too many more, and express? So or better, and a lot of the patch, which is the way and in the last.



ing, you, remove the tree and assemble her to the cockpit, too and of the landing was made on our part and the air, without the loss of a person.

—G. L. H.



HOW TO TAME HAIRS

I, too, Ma Ted R., for Gulf Aviation. Given my hair, and I'm a member of a group of men growing. Finally, I found a remedy.

After shaving, you wash your head with a hot water and about once a week. Then when you go to bed you put a glass of water on a table beside the bed. The hair roots are made lively by the salt water and come out to go a drink.

While the roots are slaking their thirst, you stand up as there and tie a knot in each. This keeps them from going back in your scalp. A few nights, and you can be bald and Mabel again.

—G. L. H.

19,000 MILES A DAY

Twenty-five days a day of the East are owned by the Douglas and Lockheed units of Eastern Airlines. "Great Eastern Fleet" These planes fly 18,500 miles and are daily, using them two great Gulf products, Gulf Aviation and Gulf Aviation.

THIS MONTH'S WHOPPER

1. In the month, a new 1 to 100,000, and

a couple of weeks ago I had a home that simply refused to go. I had the house and a New Year resolution to get going the best man a slow walk.

Last week I made up my mind and then I had a home that simply refused to go. I had the house and a New Year resolution to get going the best man a slow walk.

The truck was left in the parking lot. The house then left the road and I went every day, and I found it in the right. Once he closed a new one garage.

It took three days for me to slow down enough to get back to the table. I've been doing all the trouble ever since.

If any of your friends have trouble making their horses go, had a little of our part held near Gulf Aviation, you would be plenty.

—G. L. H.

Gulf Oil Corporation and Gulf Refining Company... members of



Official Photograph—U. S. Navy

U.S. NAVY ORDERS 40 ADDITIONAL Curtiss SOC-1

SCOUT-OBSERVATION PLANES

135 Curtiss SOC-1 Planes Delivered to the Navy During the Past 12 Months

The U. S. Navy Department has awarded the Curtiss Aeroplane & Motor Company an additional order for 40 Curtiss SOC-1 Scout-Observation Planes. This new order makes a total of 175 of the SOC-1 type ordered by the Navy Department during the past 15 months.

Curtiss has manufactured and delivered 125 SOC-1 planes to the U. S. Navy in less than 12 months. For the past several months deliveries have been made at the rate

of one plane a day—a record for peacetime production!

The Curtiss SOC-1 is the new standard Scout-Observation plane of the U. S. Navy, designed to meet the existing requirements of scouting and observation for battleships and cruisers. It is of rugged construction and incorporates features to provide low landing speed, unusually good control and maximum safety in its new when operating under adverse conditions at sea.

Official Photograph—U. S. Navy



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AVIATION for July, 1936

Let's have a look at
Tomorrow's
AirportWith bigger and faster transports
just around the corner, and with
passenger travel increasing rapidly,
problems at the airport multiply

By John S. Wynne

Chief, Airport Planning and Mapping Section
Bureau of Air Commerce

DURING the last three years our knowledge of airports has increased immeasurably. With added money available to improve and develop airports, we have had a unique opportunity for expansion. Yesterday's flying was done from landing fields lacking facilities which are demanded today, not only for the planes, but for passengers. Although tremendous strides have been made in providing adequate accommodations for both airplane and passenger, continuous effort must be applied to keep pace with future requirements.

The first necessity for a terminal airport is safety for transport operations. The Department has set minimum standards as to the length and width and number of runways necessary to obtain this safety factor. At present, few airports meet these requirements, but we are rapidly arriving at the point where they must be met or the field be maintained from use by transport companies.

Despite some differences of opinion and the conflicting changes which are natural and healthy in an industry as young as ours, a firm plan and

port should have three sets of double parallel hard surfaced runways, if the slope of the property will permit. One runway of each pair is to be used exclusively for landings and the other for take-offs. The interval between them should be sufficient to ensure safety in simultaneous landings and take-offs.

If the field will not permit the three-directional or triangular design, the prevailing strong winds should govern the layout. Runways should be 1,500 ft. long at sea level, increasing 1/2 per cent in length for each 1,000 ft. increase in elevation. Widths should be 500 ft., of which the center 150 ft. should be hard surfaced. The horizontal slope should not exceed one inch in 100 ft. per cent. The cross slope should not exceed 6 in. per 100 ft. The approach to every runway should have clearance for a 13:1 grade.

The preparation of the soil as laid for hard surfacing is an interesting and intricate problem which we are attempting to solve as rapidly as possible. Recent tests have demonstrated that the usual landing load does not exceed by more than 2 per cent the static load of the airplane. From



FIG. 1: Improvement has increased the airway.

proved and have cleared Washington are then referred to the Works Progress Administration state administrators. Somewhere the project is being studied and if it seems worthy, it is approved by the Department of Commerce. These projects then form a group from which the state administrator, acting upon the advice of his district and local officials, selects those which appear most suitable for immediate release of funds for protection of the work. Thus local conditions affecting the available labor and the desirability of any particular project receive their proper consideration.

Procurement of materials is handled by requisition through the Procurement Division of the Treasury Department represented in each state by a district officer. The specialist's advice is duly considered. The specialist may have available materials to contribute as his share of the work. While the specialist's requisition for certain items is approved, it must be within the financial limitations of the Works Progress Administration regulations, it has freedom to contribute such materials as its own expense. Specifications for equipment are generally on a performance basis. Although the Procurement Division of the Treasury may purchase equipment for more than one project at a time, the requisition originates in the field.

While it is the basic practice of the

Works Progress Administration to put its money men to work as possible under a well directed program, expenditures for materials directly benefiting the industries concerned have been considerable. Up to April 30, 1936, a total of over \$1,000,000 covers purchase of materials, including spraying material, hangars, lighting equipment, markers, etc.

Where money is going

The map, Fig. 2, indicates the location of state air work projects. Much of this work consists of improvement directly on the airway system. The original project was developed to connect the chief traffic centers, and it is hoped that this development should combine together with the improvements of other suitable for future branch or feeder system. States in which state revenue officials have identified their own plans tend to lead in the present construction program. However, the intent of the program is to aid in those states in which it is necessary to provide landing places for safety.

Fig. 3 shows how, generally speaking, the area of the greatest airway traffic density correlates with the volume of work and employment on airport projects. Fig. 2 indicates the extent of the airway program which are not given consideration in Fig. 1. Airway

improvement has been approved in nearly every state and a number of these are active at this writing.

A confirmed principle of the Works Progress Administration is the completion of numerous projects started by earlier work relief agencies of the Civil Works Administration and the Federal Emergency Relief Administration. While a number of projects were assigned under these earlier programs, much of the work accomplished could be listed as improvements to existing landing fields. The present Works Progress Administration plan has intention to support further action of these fields in a state suitably developed to permit their being termed "airports." During the past few to six years a great many landing fields, with the "airports" even though they were principally undeveloped pasture land or other district fields. Fig. 1 indicates locations where work started under the prior programs is being continued under the Works Progress Administration. Present regulations require that airport land be publicly owned before a project is eligible for construction, which prevents continuation of work started at some time under the earlier program in which the Federal Government had made direct work relief grants to the states for purely state determination of the nature of the work. Many towns have now ac-

quired land on which earlier projects were worked—now making them eligible under present regulations.

Then and now

In these earlier programs there was considerable variation in the volume of airport work done among the states which should be taken into consideration in connection with the present program. For instance, in the state of Kentucky there are only two locations indicated to serve in the present program, but there were seventeen sites developed under the prior work programs in that state.

Up to April 30, over 1,600 runway and airport projects, involving \$123,946,679 have been approved in Washington by the Works Progress Administration and returned to the state administrators for final selection. It should be clearly understood that such approval merely authorizes these projects eligible for selection by the various state adminis-



Fig. 2: Airway projects are active in nearly every state.

tration the release and construction.

The need for providing proper employment made it necessary to start some of the projects before the sponsor had completed all details of the plan. The general layout having been determined work such as clearing and grading and drainage were approved and used about while the sponsoring towns were drawing up detailed plans for hangars, lighting, etc.

Alabama's "Airports"

In some states, notably Alabama, the airport program has been combined with construction of irrigation facilities. In Alabama the state "airports" is used to denote the construction of an airport with a park area. The reconstructed facilities are so well combined with the proper handling of air traffic, while they do provide a type of local solution highly



Work is being done at Birmingham. Fig. 3: Planned airport development program.

located to the airports. Also, they tend to make the airports a gathering point of the community as well as providing food and other facilities for visiting birds, and of various agencies, provide a means of ensuring operation and proper maintenance of facilities during the period flying is not so extensive as it is expected to be. The "airports" is particularly suited to the smaller community.

Eight or ten years ago the American Legion in Alabama succeeded in establishing 26 landing fields, on two of which recreational centers were built. In 1931, when the Legion again checked up, they found all but three had not been maintained. So, these two, on which other services embodied with flying, had been so successful as to lead to further development of the "airport" plan.



Fig. 3: How the volume of work correlates with the state's economy (shaded on preference Federal funds also measure contribution).



"Go Ahead,"

Only by constant watch
over all ship movements
may traffic be handled
safely at busy airports

AVIATION
July, 1936

AVIATION
July, 1936

Newark"

By
Jerome Lederer
Engineering Division
Army Air Corps Headquarters



Source: Newark Control

TRAFFIC CONTROL is an emergency along the arteries as it is along the highways to prevent collisions of following, to obtain a continued check on progress and to enable more economical dispatching and timing of equipment. Air traffic control is most necessary during the hours of peak activity at major air terminals when a number of airplanes converge from diverse directions at the rate of three or more miles per minute, while other airplanes may be taking off at the same time. All of them may be changing altitude simultaneously. Chaos would inevitably result without some governing and restraining influence, particularly under conditions of poor visibility and low ceilings.

It would be to function efficiently in such a situation a very heavy, it should be provided during inevitable confusion. It is used under all conditions to avoid collisions and confusion, permitting an orderly sequence of take-offs or landings and maintaining constant time. Time wasted is the air in a column in hand. For example, once a modern airport about 31 per minute.

With the support and approval of the Bureau of Air Commerce, the Air Corps is establishing offices in central airports (ATCO) at all important airports. Each Airway Traffic Control Office (ATCO) is an independent corporation at each airport with a Board of Directors consisting of the airline companies of each airline on the field. The methods of control have been worked out by Earl Ward at Newark. He has been named Superior Director, Airway Traffic Control for the Bureau of Air Commerce and the system he developed at Newark will be used at other major terminals such as Chicago, Cleveland, Pittsburgh, Washington, July 1. The Bureau announced that it would take over operation of the Airway Traffic Control Office, which the airlines at each terminal have been

Airway Traffic Control

The Newark Inter-line Safety Agreement requires that "Any pilot being departing on a flight for any purpose must first give to the airport control tower and to the airway traffic control office a flight plan." The required elements of the flight plan are time of departure, cruising altitude, cruising

speed, estimated time of arrival, and the time and altitude of passing the radio marker. While the Bureau of War 15 applies only to scheduled international flying, the paragraph requiring a flight plan will probably apply eventually to all airplanes using the airports at any time. Radio equipment, too, will eventually be required for all airplanes using airport airports or enroute facilities.

General procedure

Along each airway there are certain radio check points ("check points") for the operation of two radio beams or a radio marker) over which the airline pilot reports to his company's office or destination by altitude and exact time of passing over. The last "check point" over the airport, is called the "inner radio marker." When a pilot passes over the last before the inner radio marker he advises about the time he expects to pass the inner radio marker, and the altitude which he would like to fly over it. These communications are sent between the pilot and his company's dispatching office. The dispatching office communicates "flight information" over an interphone system to the Airway Traffic Control Office. The pilot then the dispatcher any information which may be needed in the office to fly at his desired altitude and

give instructions where to "fly off" (position and altitude) for further instructions if for any reason the pilot should use some or to land right away. The airport's dispatcher transmits this information to the pilot. If, due to radio trouble or other causes, the pilot should be unable to receive or secure approval of an altitude over the inner radio marker, he automatically assumes an emergency altitude which is always held open for his arrival over the marker. This altitude is held open until the airplane is definitely landed. The pilot proceeds to the airport at the emergency altitude.

After the pilot has reported from the inner radio marker, his dispatcher notifies the ATCO, which then "clears" him to (talk to his company's office, that it is all right to fly from the marker to the terminal). Between the inner radio marker and the airport, the pilot gets in touch with the control tower (or his alternate company frequency, night frequency if flying during the day and vice versa). This radio data on the traffic around the field, wind direction and velocity, barometer reading, field conditions and clearance to land. Airway Traffic Control Office keeps the control tower advised of all airplanes approaching from the inner marker. Then there are two agencies engaged in the control of each scheduled airplane: The pilot, the pilot's dispatching office, the Airway Traffic Control Office and the control tower. (Fig. 1.) It is the control tower's control tower does not take charge until the airplane is visible over the field, any instructions to take time lost given by the airport's dispatching office and Airway Traffic Control Office. The pilot at that time is to have following the tower and arriving in other planes that he has little opportunity to talk with the airport. The new type of radio beam which permits him to be supervised in the flight, at the system

which permits simultaneous approach of the radio beam and route on different frequencies should help him in this respect.

Airway pilots

Generally speaking, scheduled pilots cannot communicate with terminals at any great a range as do scheduled air-line pilots because of limitations of their receiving sets. Also the range of the ground transmitter at airports is limited (to avoid interference with other ground station communications). The Federal Radio Commission has set aside 3,185 Kc for transmitting messages from the airplane to the ground station and 279 Kc for messages in the reverse direction. With only one frequency in either direction, interplane communications must be handled when the transmission ranges were limited. The reason given for periodic ground reports to the Department of Commerce is irregular ground stations, or to the office intermediate stations, who are permitted to be listening on 3,185 Kc. They intercept the airplane's position, altitude, and time over ATCO. They also can make any speed information in the airplane over 279 Kc. This might be called decentralized communication. If the day does not have two-way radio, the airplane is available only if the ground station is in the lookout for the airplane.

The control tower and its limited in range at this it will act in concert with other radio communication on 279 Kc. between nearby flights and the pilot. When talking to the control tower the actual pilot with the alternate air-

frequency flight frequency during the day and vice versa) to prevent confusion in the air-line frequency being used by his company to direct other pilots.

Outgoing airplanes interest the Airway Traffic Control Office only to the extent that the altitude and time of passing over the inner radio marker must be known to transmit this information to the appropriate pilot and to the Airway Traffic Control Office at destination and to be sure that the pilot has followed his flight plan. Once beyond the inner radio marker, the progress of the airplane becomes the concern of the destination control office.

If the interplane agreement, are followed the possibilities of collision between scheduled planes along the airway are remote. But the Airway Traffic Control Office is not so much concerned with preventing collisions along the airway as in the vicinity of the inner markers, paths in which airplanes are converging.

Traffic density

Newark Airport has 64 scheduled arrivals and 66 scheduled departures per day. Added to this are cargo flights, passenger baggage, Army and Marine planes and numerous flights. The peak hours occur between the hours of 4 and 8 p.m. when there are as many as twelve scheduled movements per hour. Some of these are very closely spaced. Delayed departures and extra arrivals may increase the density. The Newark ATCO is arranged to have the full complement of four men in the office during hours of greatest traffic density. At such times they work with dynamic



Fig. 1. Newark Airport (ATCO) system for the movements of scheduled airplanes.

How Rhode Island State reconciled the specifications of both airport operator and pilot in a single installation.

For the Airport Lighting Problem: A New Formula

By Major F. E. Huise

U. S. Tullahoma, Jr. & Co., Inc.

BRING UP the subject of lighting at any gathering of airport officials and you will get almost as many opinions as there are participants in the discussion. And if you are faced with an airport lighting problem the best procedure is to get as many sound opinions as possible, weigh them carefully in the light of your own experience and the requirements of the particular airport, then use your own judgment.

This is essentially the procedure followed in laying out the system used at the new Rhode Island State Airport at Warwick. The design was made after careful study of the requirements of a large number of operating companies expressed in replies to a widely circulated questionnaire. As a result the installation satisfies the requirements of a typical airport of medium size for day and night transport accommodation.

Modern in every aspect, the Rhode Island State Airport had perfectly graded runways for all-way use, three 1,000x150 ft. concrete runways, a 1,600x150 ft. concrete apron, and a multiple drainage system. On the north side of the field is the administration building and light control is centralized in the port director's office. Piles of radio equipped ships can ask for whatever illumination they want. Floodlights, flood lights, or a combination combination of all such are available on request. An illuminated tree gives both direction and variety of view and a spherical beacon marks the field.

For general field lighting two groups



Top: Wind direction and velocity are indicated by this directional tree of Pyle National Service. Above: One of the five units of General Electric floodlights. Right: No ground level, but a Barker-Karpis plane projecting three beams.

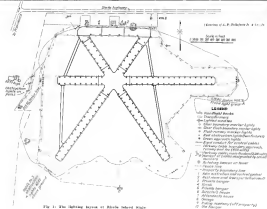


Fig. 1. The lighting system at Rhode Island State.

land planning. Some states, including California, Oregon, Michigan and Florida, had developed well-organized programs, while others were still struggling on their own. Most of the better plans were made with primary consideration for airport developments along the trunk line airways and around any stress on possible feeder line developments.

A case for your airport

Swimming pools, golf courses, and a miniature zoo were among the extraordinary attractions developed under the airport or terminal expansion facilities at airports. In spite of the successful examples at Glendale (Aviation, November 1969), Alamo, and other ports (Aviation, June 1969), the broken record for an auto race track, large numbers of airport managers are understandably opposed to any departure from aviation activities at these facilities. In general, the operators whose aviation activities are combined with recreational attractions are less concerned with budgetary and public acceptance of the airport as an established institution than the others. It is the sense of several contributors that diversified non-aviation facilities would do much to aid aviation to the public, providing they did not detract from the aviation interest.

Surface problems

No standard formula could be developed for the technical problem of runway or drainage layout in a comprehensive way. Each project must be regarded as a special case. Funds available determine the surface materials suitable for a given airport, including type and volume of traffic, altitude and character of field, and funds available. It was generally contended that concrete was desirable where its cost was not prohibitive but its major disadvantages lay in its destructive effects on airplanes. Surface materials derived by asphalt treatment of soil are attractive alternatives recently because of their mechanical weakness and relatively low cost. A statement on the experience with these various types of surfaces at Denver Field, Santa Monica, Calif., Glenn L. Warren Airport, Middle River, Md., Burlington, Vt., and other places was furnished for the conference through the American Road & Builders Builders Company. This project is subject to a number of variations and requires preliminary chemical analysis of the soil for neutralization of the correct dosage. Certain types of asphalt construction require fairly continuous use to keep the surface bonded into position as hot weather sets to prevent disintegration from brittleness in cold periods. Maintenance of seal is of tremendous importance in making keeping strength may be highly desirable to the surface.

Although solid stabilized runways were not discussed extensively at the confer-

ence, their application has attracted much attention among road and airport builders seeking acceptable methods of construction. The process of concrete construction essentially is providing a deep subgrade of properly selected rock and a surface of ordinary and solid both chemical agents for satisfactory elasticity. The moisture seal is an effective barrier. In addition to its low cost this type of runway construction is particularly adapted to relief projects where there is an excess of false soil materials.



Charles Smith, Jr., Director of the National Airport Council



Frank M. Steiner, Director of the Council

WPA has built a substantial mileage of satisfactory and stabilized roads in upstate New York where the character of the soil is well adapted to this treatment. Decision pending on character, reliability and cost is an essential condition for success in this type of construction. Like the aluminum type of runway, soil stabilized areas may be used very successfully as subgrading for future concrete construction.

Experiments of soil fields appeared in various parts of the country and conservative studies of sealing and grain formulas have been made by Edward S. Baker at Rochester, William W. Brown at Hartford, Major D. E. Pullen, at Alamo and Major John K. Barry at Cleveland. (Some detail is available from example of a soil field.) The ultimate solution to an airport surface problem often lies in a combination of types of treatment. A central concrete strip with stabilized shoulders and tie between runways was one interesting combination discussed.

Runway drainage, Lights

More important than the delivery and application of surfacing is the drainage of airport runways. Most of the damage done to runway surfaces is due to improper drainage. Leading lights are relatively unimportant. Drainage centered largely around the form of runways for proper drainage. In concrete construction the selected crown type (Grade 3 or 5 in 50 ft) found many exceptions. A new development is Rhode Island State Airport is a comprehensive, including a normal crown on the center and inverted crown on each side to divert water into the drainage system rather than rely on the center of the runway. Close supervision is required in this type of construction as contractors may be inclined to dump with drainage results.

Operators from cold countries have made extensive use of a device known as Snow-Gu which causes snow to melt in a whirling space and deposits it in the form of slush at the side of the runway padding the snow with tractor drawn "plow" and substituted by aerial seeding New York City.

Lighting agreement could be found on the important subject of airport lighting for most of the discussion. Included in the question of flood vs. flash runway marker lights. Floods as general aid to flightlights because of glare and airport managers feel that the landing area should be illuminated before landing to reveal any possible obstructions. Wilbur Pfeiffer, chief of the Brookline State Airport, Boston, has confirmed both at his new airport and used the floods to illuminate the area before landing and the flash lights to outline the runway. (Illustration details are on page 25.) At Atlanta Airport Manager Jack Gray has devised an ingenious floodlight beam to divided beams

Editorials

AVIATION • ENTERTAINMENT
FUTURE IN FLIGHT

■

OPEN LETTER TO A SENATOR

Respectable Royal S. Campbell,
Washington, D. C.

Dear Doctor Campbell:

You were much honored in your preliminary report on airline safety as it appeared in the Congressional Record of June 26. Finally it is a much better job than we had expected. Obviously, you have made a great deal of effort to get on time and to be fair in your deductions. Dedicating some of the technical details of the Carving services, some of your experts have gotten in a bit over their heads, but, by and large, they have treated our reasonably fair representation of what might have occurred.

We are much less concerned, however, with the details of the accident than with your recommendations which dealt with the reorganization of the Bureau of Air Commerce. It is gratifying to note that you have reached some of the same conclusions that we expressed in our editorial in our May issue.

You have concluded yourself that the real mistake was made in the way the present bureau was organized and expanded, that the men who charge have worked under a working from the start. We cannot help but see with some alarm the implications of the "whistleblowing" of some and the denials of other of the Bureau personnel. As we have stated before, we have nothing personally against any individual in the Bureau, but we feel that with confidence as they see it would be futile to attempt anything short of a complete reorganization in the executive departments. The funds which have developed during the past three years are now so depressed that a victory for any one faction would severely curtail the results. It might conceivably make conditions much worse.

We are convinced that the time is long past for better measures. The only possible way to restore industry confidence in the Bureau of Air Commerce is to free it entirely from its political shackles. Merit, perhaps, but never not impossible.

We are looking forward eagerly to the balance of your report which deals with airline safety. We expect, however, that we must wait until sometime "early next year." A lot of people, including ourselves, are going to take on the airlines a good deal between now and the spring of 1971 and it seems not bad that we must be deprived of the benefits of your committee's findings in the interim. Or, would it be, by any chance, that the airlines are not as useful as the press reports in your committee's activities have led the public to believe?

Respectfully yours,

S. Paul Johnston

Editor

DISSEMINATION IN CAMP

WE HAVE had great hopes that the formation of the new Air Transport Association of America marked the beginning of some real cooperative effort on the part of the airlines to solve some of their common operating problems. Lately, however, we have been not a little disturbed by arguments cropping up here and there over the routine membership contributions of members, and the problem of route competition. We are not surprised that differences of opinion should arise over these questions, but we cannot help but deplore the attitude taken by some of the airlines efforts in arguing their case before the Interstate Commerce Commission. Charges and counter-charges involving rail faults have been made. Claims have been made by some airlines in unrelated cases, obviously set up for purposes of "bait-and-switch." Members of the air transport industry are not in a position to make such claims in relation to other modes of transport. This obviously might be avoided by setting inter-line disputes, where ever possible, within the confines of the A.T.A. A great deal has been accomplished in a short time by cooperative effort in the technical departments, but we hope that the good work already started will not become completely bogged down in a welter of inter-line bickering.

SOARING SEASON

LAST YEAR we expressed the idea that the time that moving activities in this country would be settled as to better and better times in spite of the loss, through a natural death, of W. W. C. Hines. Judging from the interest in Hines this year, our hopes seem to have made a good start toward fulfillment. Although it is too early to set up the final score in terms of records broken and better done, the indications are that this year's performance will far and away exceed last year's. Longs, Scofield, Eusey, and other officials of the moving sector have done a good job on organizing and carrying through the summer's most "move power" in them.

Flying Equipment

If that's true in aircraft, engines and major accessories

Aeroneer 1-B

New two-place all-metal monoplaner makes its appearance on the Pacific Coast

PRESENTER rumors of a new airplane for the private flyer have been drifting East from the Pacific Coast for some time, but so far details have been lacking. Now, however, here they are. We present the Aeroneer, soon to be in full production by the Aero Engineering Corporation of Los Angeles and Long Beach. The new design is designed and constructed along important lines and brings to the private pilot many of the features that have come to be accepted as standard in large warbirds and military auxiliary planes. Designed for the Moisant C-4 engine (see page 45) the Aeroneer offers an interesting addition to the monoplaner and two-place airplane field.

The fuselage structure follows modern monoplaner construction practices. Heavy tubular members carry the stresses from the engine mounting in the forward to a point behind the main wing where they take on and are replaced by struts. Engine mount fittings are riveted and bolted to the front end of the fuselage members and the welded steel tube engine mount is attached to the fittings by tension bolts. Vertical stiffeners are used between the two heavy members at each side of the fuselage and are designed in such a way that the sides of the fuselage and the other sections are Moisant boxes. Since the cabin structure is not totally closed, four chrome molybdenum steel tubes are built into the structure to take the tension from the rear of the fuselage down to the wing. They also increase the rigidity of the structure around the cabin and would carry any engine loads in the event of a resonance. The skin is 26ST Alclad and the fuselage is aluminum steel 915 in 14 thickness.

In order to simplify maintenance, the wing is built in two sections—the outer section, two outboard wing panels, and two inner, each of which is independently removable. The operation of removing the outer wing panels from the outer section appears like this one below. Tips are fastened to outer wing panels in pairs of bolts and double wing nuts and the outer wing panels are attached to the outer section by means of attaching angles and bolts. The wing tip is bolted

up on skin and spars and lowers which form to the skin located at the tip of the outer wing panel. The outer wing panel is of different skin construction using a combination of fabric and beam type of structure. The beam is designed as a three fold beam with vertical stiffeners and supporting members according to Wagner's analysis of the shear beam. It is located at the 20 per cent point of the chord and its construction is strictly from tip to tip and perpendicular to the plane of symmetry of the airplane. This arrangement eliminates any eccentric loading of the spar. A shear-carrying member running along the wing at 65 per cent of the chord carries the torsion load formed by the winging.

Adapters are built of 26ST Alclad and covered with fabric. They are attached to the wing by a pins longer on the top surface extending the full length of the adapter. Flaps are attached to the lower surface of the outer wing panel and are generally similar in construction to the ailerons. In the wing the ailerons are located at the rear end of the outer

wing panel in channels constructed back to the attaching flange. Spar caps on both top and bottom of the wing at the joint between the outer wing panel and the inner section are riveted into double plates which also are fastened to the attaching flange.

The center section is structurally similar to the outer wing panel. Landing gear mounting is a 26ST landing strut



The Aeroneer in the course of construction—skin which fitting has been removed to show landing gear.



Landing gear on the tail in the Aeroneer.

mounted to the top surface of the outer section and also to other-wise bulkheads which are designed to the main spar by means bolts besides being riveted to the skin along four main spars. The spars are stiffeners forward of the main spar on the top of the wing take on between the point of the outer section and the outer wing panel as they approach the fuselage. Some stiffeners take on from just behind the front spar to take up the loads. These extra members are under part of the center section which is used in a set, adding substantially to the rigidity of the structure.

The center section is bolted to the fuselage by means of a heavy landing 26ST angle riveted to the top surface of the outer section and to the lower main member of the fuselage. On the outer section the flap is carried on joint hinges and is actuated just ahead of the joint by means of an interlocking stress mechanism driven by torque tubes passing through a control rod on the outer section. Control wires and gear lines also pass through the tunnel. Gasline tanks are located in the center section aft of the main spar and forward of the shear-carrying spar joint.

Flaps horizontal and vertical flap surfaces are built up of 26ST Alclad and covered with the same material. Flaps are made of metal structure and fabric covering. The front part of the ailerons is designed to take the shear and localized loading loads. The rear spar is designed to carry the total bending moment across the stabilizer structure



The Aeroneer (left) going, (center) and (right) landing.



Detail of landing gear design.

The front spar of the vertical flap is designed in the same manner as that of the stabilizer and the rear spar is designed to take the bending load and is bolted into a fuselage bulkhead. Elevators and ailerons are constructed by balanced control is by torque tubes, horns and cables and ball bearings are used primarily in the system.

The front line of the flap spar is 18 in. ahead of that of the stabilizer to provide sufficient room for the horns and actuating mechanism and to support control as well. This feature has been tested successfully in European and British designs.

One aileron and the stabilizer are fitted with adjustable trimming tabs. Elevator tabs are controlled by an irreversible lead screw through main gear horns and a torque tube leading to a control cable in the cabin. Dual control is provided and the aileron linkage is so designed that a failure in one would not affect the other one.

The tail cone is of aluminum fabricated with bolts and Elastic Stop Nuts in the rear of the fuselage structure. It is fitted with a socket for a Green's ball light. Warning lights of the same type can be installed just outside of the place as to be

the wing tips bolt to the outer wing panel.

Besides the main wing tanks in the outer section there is an auxiliary tank behind the forward which feeds to the fuelmeter by gravity. The emergency tank may be filled from the main tanks by a mobile pump and carries sufficient fuel for 1 hour of flight. An 8000 psi pump and a mobile pump are used in the main tank system and a standard oil pump, furnished with the engine, draws oil from an aluminum tank on the fuselage.

Each landing gear wheel consists essentially of a single steel axle incorporating an alloy-steel shock absorber. The main landing wheel construction, bearing and torque loads, the latter being transmitted from the wheel by a torque-yoke roller. A tail wheel of the 800 psi rated type gives a road speed which is reduced to the fuselage by two steel legs which extend outside. Vertical motion is increased by an oleo shock absorber.

Three parts comprise the cabin enclosure—a fixed Plexiglas windshield and two sliding sections of the same material. No structural loads are carried through the windshield supports. The fuselage runs on dual wheels rollers to prevent landing and may be locked in position for a landing gear.

Specifications of the Aeroneer 1-B are: span, 24 ft. 6 in.; length, 24 ft.; height, 7 ft. 8 in.; wing area, 168 sq. ft.; maximum climb, 44 ft./sec.; cruise speed, 1800 ft./min.; gross weight, 1800 lb.; stall load performance, high speed 140 mph (sea level); cruising speed 135 per cent stall speed; rate of climb, 4000 ft./min. (flaps up); 16 mph.; rate of climb at sea level, 100 ft./min.; service ceiling, 15,000 ft.; cruising range, 340 miles.

This performance is based on the Moisant C-4 rated 120 hp. at 2175 r.p.m. and 1000 ft. altitude. Moisant B-4 (105 hp.), C-45 (120 hp.) and B-3 (100 hp.) as well as radial and in-line engines of similar power may be installed. Final performance is variable.

Details of the Aero Engineering Corporation are: Dr. Arthur L. Klein, W. C. Ruckelshaus and Melvin Sussman. Other members of the corporation are: Edward G. Ward, Carlos Wood and Milled Chavira.

Brown Model B-3

Commercial adaptation of famous rescue now available

PRIVATE rescue now has added with recent times at the speed rescue ship built in 1958 by Brown of Los Angeles is now available a commercial adaptation of the famous rescue plane. The new Brown Model B-3 is a custom built open plane, which is a two-place open-cockpit plane. It is designed for the rescue mission of the private pilot who has a chief

Q. E. D.

CURRENT performance of the China Clipper and her sister ships demonstrates beyond question the capacity of planes of this type for trans-Pacific service.

Carrying heavy pay loads, these Martin-built Clipper ships in their stride the 5,410 mile hop from San Francisco to Honolulu—the first leg of their 8,000 mile route across the Pacific. This San Francisco-Honolulu hop is 356 miles longer than the longest hop on the now proposed U. S. to Europe routes.

THE GLENN L. MARTIN COMPANY

BALTIMORE, MARYLAND

Builder of Clipper ships since 1939



AVIATION July 1944

35



A new four-cylindered motor Menasco B-3

or fan. Like the racing plane, it is outstanding for its appearance and finish. The first B-3 has been built for Dr. Ross Bechtel of Los Angeles, who plans to use it as long distance personal flying. Although the model is a single-plane ship, it has ample carrying capacity for two people and may be converted readily into a tandem two-place cabin plane. The B-3 design is such that the ship might be converted for ordinary air and negotiations now under way with foreign governments may lead to a special military adaptation.

The B-3 design is generally similar to that of the "Miss Los Angeles" ship. It is a wire-braced low wing monoplane with rigid landing gear and highly streamlined fuselage. The fuselage is a welded steel tubing and the wings are built of wood with wire bracing. Tail section structure is of metal with wire bracing. The engine structure is fabric covered, except the engine compartment and the quarter finning to the pilot's cockpit which are covered with aluminum. A full V.A.C. charge system is used around the engine and is quickly removable for inspection. To improve the aerodynamic characteristics, a "hub-tension" spinner has been designed to surface the motor propeller hub and provide the necessary streamlining for the starting device. The pilot's compartment is covered with a sliding hatch that may be opened or closed during flight.

The chief distinction between the B-3 and the Beeve system is the substitution of the full Menasco Type six-cylinder which consists of automatic landing valve slots manually operated, ducted flaps and ducted ailerons. All this has been incorporated in an extremely thin wing section. Not only have the slot and flap operating mechanisms been detached from the wing, but wing bracing fittings and retractable landing lights are also built as retract protrusions. Through the use of the Housler Pathe system a speed range of approximately 150 to 200 m.p.h. has been obtained. The full weather vane flaps have been found to provide more improvement at take-off.

The engine is the latest product of the Menasco plant—the Super Beeve engine. This engine is rated 750 hp at 6,000 r.p.m.

stroke and 250 hp. for take-off at an interval. It has been designed for transport and engine plane use and has been announced as optional equipment on the new Lockheed Model 12 biplane plane. Among its special features is a fully enclosed valve gear with automatic lubrication of push rods and order arms and automatic overcrank to reduce losses.

The movement modifications specified by Dr. Bechtel include: Mand flying equipment, two-way radio, and engine temperature thermometer. Although an adjustable Hand-on-Standard propeller has been used in flight tests, it is believed that a full controllable propeller will be installed in the near future.

Specifications of the Beeve B-3 are as follows: span, 32 ft.; length, 26 ft.; height, 8 ft.; weight empty, 1,850 lb.; gross weight, 2,600 lb.; wing area, 150 sq. ft.

Performance is as follows: maximum speed, 205 m.p.h.; cruising speed, 200 m.p.h.; landing speed (with flaps), 40 m.p.h. (with flaps), 50 m.p.h.; service ceiling, 10,000 ft.; climb per minute, 1,200 ft.; cruising range (normal), 600 miles.

Menasco Engines

Piston and Beeve are to be produced commercially

LONG ISLAND as recent exhibitor, two engines known appropriately as "Piston" and "Beeve" by Menasco, are to be produced in commercial quantities in the near future. Ever since the first "Dixie" (A-4) engine on A.T.C. six years ago, Menasco engines have made three marks in records all over the world. The last is too long to repeat here.

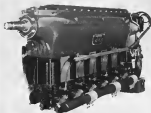
Development and flight testing have



The prop and spinner



The landing valve slot



The Menasco Model B-3

"The GREATEST NAME IN RUBBER"
IS
A GREAT NAME IN AVIATION TOO

MOST people, when they hear the name "Goodyear," think first of tires, tubes—and other rubber products.

But, in the airplane industry, a broader meaning attaches to this name. Here, Goodyear stands also for pioneering in the development of brakes, controls and wheel equipment for all types and sizes of airplanes—equipment which has contributed its share to the advancement of flying and the design of ships.

Goodyear literally grew up with the airplane industry.

And this shoulder-to-shoulder association has provided both the experience and inspiration

for the long list of Goodyear "firsts"—among them, the Airwheel, first and only super-soft tire—the first hydraulic brake design developed exclusively for airplanes, rather than simply borrowed from the automobile; the first pneumatic airplane brake in America; and a dependable line of mechanical and hydraulic controls.

SHIP

SHIP TYPE

1000 tons - 1000 tons
1000 tons - 1000 tons
1000 tons - 1000 tons

EQUIPMENT

1000 tons - 1000 tons
1000 tons - 1000 tons
1000 tons - 1000 tons

If you have a rough problem, involving brakes, controls or tires, Goodyear would like to talk to just one of our Aeronautics Department, Goodyear, Akron, Ohio - or Los Angeles, California.

²⁴If it were a *Goodman*, then it is the whole *NEWBELL* is *Goodman*: *Goodman* is equal to the G. F. A. and therefore the word, and it is used to show that *Goodman* is the whole make of *NEWBELL*. The

UNDER THIS FLAG

 OF LEADERSHIP

HAIR PRESERVE TYPE

Checklist ready - tonight's last night - Harvey Quay ready
 Greg's Carney eggs - Ron's Rice again - tonight's meal
 Don did good - 10 spots for 3 up to 1400 12 with future
 members and members

AUGUST 1997 SUPPLEMENT

10–12 mm; 2 at 1–3 mm; 4 at 1–20 mm with lobes. Re-bases are strongly papery to spongy. Triterpene butanol and structural formulae differences shown. No biotic ligands. Whole with mechanical hard tips broken. Whole and *Caedanea* triterpene data were broken. Whole with 1–20 mm present and 100 mm broken. One spot – triterpene, some triterpene, triterpene base and several ligands for hydrocarbon base. Four main triterpene, one and a 1,2-diol.

MEDIATE OR LOW PRESSURE TYPE

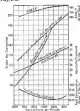
8 mm; 18 to 20 mm; 25 to 30 mm. 21 mm yellow-orange and processes red. Whorls with hyaline disc eyes and prominent disc eyes hooks. Some complete line of 100 mm or less. No teeth.

VERBARGLINE TYPE

For landing: wings—2 pairs. For takeoff—2 pairs.
Eggs—400 per pair and color—translucent type and
white. Each type suitable. And: and square.

THE GREATEST NAME IN BUSINESS

GOOD YEAR



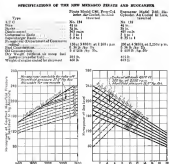
For information, contact: Rep. Rick Warren

continued during the six-year period and the additional approved type certificates have been granted on models subsequent to the A-4 F-Series. The production models are the familiar C45 (A.T.C. 134) and 805 (A.T.C. 159). These engines are the lowest horsepower supercharged engines available in this country.

The superchargers are all Messers designs and manufacture and both engines embody a special feature in the superchargers gear train to permit direct drive without a slip clutch. An exposed supercharger scroll and lung intake manifold together provide an inter-cooler effect which reduces the temperature of the compressed charge and permits the use of high manifold pressures without excessive heating.

Cruciform construction is generally superior in both respects. The two-cylinder case is split on the crankshaft centerline and major stresses are carried by the lower half while the upper half acts as a cover. In the one-cylinder model the case is of the one-piece type, formed inside and out for strength and ease of cooling, and having a cast door on the side for access to the crankshaft. In the two-cylinder case of one design (together with the case, while the two-cylinder design employs four separate mounting lugs of cast aluminum. Both cases are made by Wyman Gordon Corp., Detroit, Mich. The two-cylinder design is a 200-hp, 2800-rpm, four-cylinder engine has five main bearings while the one-cylinder model has seven. Both engines are built in less than an hour. All main and connecting rod bearings are of hollow steel.

Prisms are of full short-wafer head type with guarantee underhand crown fitting to give added strength and best dispersion. Piston pins float in both the connecting rod and piston, and are located by end bolts. Slashed iron cylinders are standard on both engines although steel cylinders are optional for lighter weight. Removable heads are

Akkada submissum of *B. meli* (acuticarpum) cells 870-11

held in a cylinder and through to the cylinders by long nickel steel shafts which provide easy servicing. Any cylinder head may be detached by removing four pins and disconnecting the intake and exhaust valves. The cylinder head is an aluminum alloy with one intake and two exhaust valves per head, spread laterally to provide ample cooling area over the head itself, and with generous flanges for efficient cooling. The crosshatch steel cylinder and top and bottom covers are S.A.E. type. Standard S.A.E. dimension changes are incorporated in the necessary case for mounting both generator and starter. Magnetic armature is standard with battery ignition system. The engine is of aluminum alloy construction, and is of 16-mm bore boundary position, as

a wealth of inquiry research has gone into the perfection of improved alloys and testing methods.

Rearwin Seaplane

Sportster model now available
with floats

ALL REARWIN Sportsfans manufactured in the future will be equipped with fittings for the airplane foot attachment. The ship was licensed as a seaplane ready to fly with Side 1525 doors.

The amphibious Sportster is licensed for two persons, 26 gal. of gasoline and a 50% allowance for baggage and equipment. Licensed gross weight is 1,615 lb.



Altered capacity as a measure of baroreflex function (the Windkessel model) showed no loss in high speed performance.

North American NA-16

First ship from coast factory is a general purpose plane suited to a number of military missions

Ten years prior to come out of the Pacific Coast factory of North American Aviation, Inc., the NA-16, a modern military ship designed to Air Corps specifications and available in five variations—a general purpose plane, a two-man fighter, a bomber, an ad-

vanced trainer, or a single seat fighter. The NA-16 is low-wing monoplane of all metal construction designed for high performance with loading characteristics suitable for small fields. Particular attention has been given to maintenance and engine installation has been de-



The General Aviation B7E Army Air Corps version of the NA-16 series

DESCRIPTIONS AND PERFORMANCE

Type	NA-16A	NA-16B	NA-16C	NA-16D	NA-16E
Engine	Pratt & Whitney R-1530	Pratt & Whitney R-1530	Pratt & Whitney R-1530	Pratt & Whitney R-1530	Pratt & Whitney R-1530
Power (Horsepower)	180	180	180	180	180
Speed (Mph)	180	180	180	180	180
Altitude (ft)	180	180	180	180	180
Range (Miles)	180	180	180	180	180
Load (Lbs)	180	180	180	180	180
Weight (Lbs)	180	180	180	180	180
Price (\$)	180	180	180	180	180
Production	180	180	180	180	180
Notes	180	180	180	180	180

veloped so that the entire power plant can be removed and replaced in three minutes in 40 minutes.

Designed in a self-contained unit to take almost any radial engine from the 100 to 1,000 through the Wright Whirlwinds and the Pratt & Whitney Wasp, the power plant installation represents considerable ingenuity. Sinker type fittings, stressed by tension bolts, connect the winged aluminum nacelles to the engine mounts to the fuselage structure. Engines mount high enough to clear the landing gear to allow direct engine and propeller vibration. The oil system is retractable as a unit with the engine mount and all connections are of the solid metallic type. Oil coolers are provided when necessary. Cowling plays provide contact for electrical connections between power plant and fuselage and can be made or broken in three minutes. Engine control rods are designed for low maintenance and easy reassembly. Cowling has been designed for the accessibility of all power plant parts and all control points are interchangeable.

Automatic alloy fuel lines are equipped with compression type fittings with flexible metal connections to facilitate removal. Fuel tanks are located in the center section wing struts on either side of the fuselage.

The wing is constructed in five sections—two outer panels, two tip sections and the center section. Right and left panels are interchangeable. Most likely to be damaged are the tip sections which are easily replaced simple and easy to replace. Rugged aluminum alloy construction of the stressed skin type is used and the outer wing panels are arranged so that they can be made weather-tight to provide emergency structure. NACA 2215 to 2209 airfoil sections have been contained in the development of the wing. Guston overloads and dihedral have been employed. Altimeter



LOS ANGELES



"Fastest-Shortest-Coast-to-Coast" Powered Exclusively by WRIGHT CYCLONES

Wright Cyclones power all of the de Luxe Douglas Skycoasters operated by Transcontinental & Western Air—the fastest, latest route from New York to California.

The famous TWA "Sky Chief" leaves New York at 5 P.M. and arrives in Los Angeles at 9 A.M. the next morning. This flight is one of our fast economical schedules operated daily, in both directions by "The Lindbergh Line."

TWA has long operated a non-stop service, in both directions, between New York and Chicago. Morning, noon, afternoon and night TWA offers convenient schedules between America's largest cities. On June 13, 1936, the "Sky Chief" made the New York-Chicago run, with a capacity

load, in the record breaking time of 3 hours and 48 minutes—37 minutes ahead of schedule!

The Chicago-New York commercial transport network, also established by a TWA Cyclone-powered Douglas Skycoaster, was made last winter in 3 hours and 34 minutes—at an average speed of 232 miles per hour.

The Wright Cyclone is the most powerful single-row, radial, air-cooled engine in service operation. Cyclones are used exclusively on TWA and other leading airlines of the United States—and they power the fastest transports on leading airlines throughout the world. "Forward By Wright" is your assurance of swift, dependable "Travel By Air."

New TWA Schedules!
Non-Stop Flights
New York to Chicago
Overnight
New York to California



WRIGHT
AERONAUTICAL CORPORATION
PATERTON NEW JERSEY
A DIVISION OF CURTIS-WRIGHT CORPORATION



FOR Happy Landings...



FIND OUT WHAT YOU CAN DO WITH TUBING

Call in a National Tube salesman, a specialist in the application of seamless tubing. He will gladly work with your production engineers and designers in the solution of your problems. His co-operation can be purchased and paid for under an agreement.

SHELBY Seamless AIRCRAFT TUBING

To safely absorb the shock of today's fast take-offs and high-speed landings — that's a job that Shelby, hydraulically cushioned, with pinions and cylinders of Shelby Seamless Aircraft Tubing provide a happy solution. For the light weight, high tensile strength, ductility and durability of this superior steel tubing offer the designer and builder a service-oriented material which increases the maximum of safety, with lightness and superior strength. Its wide latitude in application and excellent machining qualities keep production costs low.

SAFE — because it is structurally sound

Shelby Seamless Aircraft Tubing, made by America's largest and most experienced manufacturer of mechanical tubing, conforms to the highest standards set by the United States Army and Navy specifications. Available in chromenickelchromium, mild carbon and stainless steels, both round and rectangular sections. Quick delivery from stock assured by distributors located conveniently at hand. These stocks are carried in specific lots, so that actual test reports which accompany shipments can be furnished for each lot at time of delivery.

Round Tubing is also available in Shelby "BF" Aircraft Tubing, which has an improved bright outside finish.

NATIONAL TUBE COMPANY

PITTSBURGH, PA.

Corrosion Resistant Steel Products, Portland Cement Products — 51 and 52nd Street, Portland, Oregon — New York, Boston, Brooklyn



UNITED STATES STEEL

are dynamically balanced and differentially controlled and split trailing edge flaps are of the "Wright" type patented by North American Aviation. They are automatically operated by a very powerful hydraulic line and the maximum control force required is 8 lb. Flaps can be raised or lowered in eight seconds.

The fuselage is a curved and simple structure built of chrome-molybdenum steel tubing with large doors and openings for maintenance and inspection and fittings and strengthen the wings. Fabric covering is applied in panels for convenience in inspection and servicing. Tail surfaces are full cantilever with stabilizer and elevator interchangeable right and left. The stabilizer is rigidly fixed and trimming is accomplished by a non-reversible type of tabs on the elevator. A movement of less than 2 degrees neutral is sufficient to correct for all average load conditions and the control load is practically negligible. A tab adjustment on the ground is provided for trimming the stabilizer. It is and stabilizer are metal covered while the other surfaces are covered with fabric. The fabric-covered removable surfaces are aerodynamically balanced for cost and control and dynamically balanced with built-in weights to prevent flutter at high speed.

Although the ship is normally equipped with two retractable landing gear, a retractable type is available which maintains performance is desirable. The standard gear is a completely cantilever and fitted with a simple aluminum alloy structure which does not reduce the wheel. The position of the wheel



The Grumman two-seater Pratt & Whitney Wasp Cub by at 2,000 ft. in flight.

is sufficiently far forward to make it extremely difficult to nose over in landing. Shock absorbers are of the long stroke duo type with an air-cushion for landing.

Fixed machine gun installations have been developed and one of the two synchronized guns may be installed in each installation in a separate unit. Armament doors are removable and may be inwardly fully loaded. The double machine gun in the rear cockpit is almost completely lowered when not in use and has no effect on the performance of the airplane. The mounting is of the track type permitting complete coverage of the rear hemisphere. Absence of

cowl surface bracing contributes to the effect of the installation.

New Grumman

Two-seater developed for transportation and experimentation

A new Grumman airplane, similar in appearance and design to the earlier PV-1 and SP-2 models has made its appearance recently at several airports. The new ship is a two-seater and differs especially from its predecessors in that it is equipped with hydraulically operated split flaps on the upper wings and ailerons on the lower wings. The company plans to use it for experimental work and transportation of customers.

Spartan Executive

Modern metal plane is to be available with Wasp or Jacobs engines

TWO PLANE are now under way on the Spartan Executive, new all metal low wing composite unit to be manufactured to commercial quantities by the Spartan Aircraft Company, of Tulsa, Okla. The first ship is powered with the 285 hp. Jacobs engine and a four-seater model, with the control of emergency, will use the 400 hp. Pratt & Whitney Wasp. Production of the four-seater Jacobs model will follow completion of eight tests.

Hall Wing

Latest installation is in new GA-36 airplane

LATEST STAGE in the long period of development of the Hall High Lift Wing is its installation on the new model GA-36 airplane, now completed by the Cunningham-Hall Aircraft Corporation



Jacobs powered Spartan Executive



Cunningham-Hall Aircraft Corporation GA-36



Map by courtesy of Pioneer Instrument Co., Inc.

American Airlines, Inc.
Boeing-Martin Airways, Inc.
Boeing Airways, Inc.
Continental Airways, Ltd.
Crested Airlines, Inc.
Central Vermont Airways, Inc.
Chicago & Southern Air Lines
Delta Air Lines
Eastern Air Lines
Hawford Airlines, Inc.
National Airlines System
National Airways, Inc.
National Dair Airways, Inc.
Northwest Airlines, Inc.
Pan American Airways, Inc.
Pioneer Instrument & Transport Co.
Transcontinental & Western Air, Inc.
United Air Lines
Vernoy Air Transport, Inc.
Wendell Wilbur Air Service Corporation
Western Air Express Corp.
Wilmington-Catalina Airline, Ltd.
Wyoming Air Service, Inc.

ROLL CALL!

The roll call of Transport Lines in the United States is a roll call of Pioneer customers. Since the organization of regular scheduled operation more than ten years ago, Pioneer Instruments have been a part of the equipment of every Airliner. To complete schedules regardless of weather conditions, absolute dependence must often be placed on instrument equipment. The splendid record for the maintenance of schedules is proof of the reliability and accuracy of Pioneer Instruments.

PIONEER INSTRUMENTS

PIONEER INSTRUMENT COMPANY, INC. • 794 LEXINGTON AVE. • BROOKLYN, N. Y.
A SUBSIDIARY OF THE BENDIS AVIATION CORPORATION

at Rochester, N. Y. The new airplane is an all-metal, low wing type with full X. A. C. A. winging. A notable characteristic is the design is the high position of the horizontal tail surface. Location of the Hall wing is the GA-35 indicates a full span automatic flap in the lower side of the wing and its action is the upper surface. Flight with have indicated that the arrangement provides satisfactory lateral control throughout the entire range of angles of attack including stalling and that the airplane is highly maneuverable under all conditions of flight.

The Hall High Lift Wing is the invention of the two Hall brothers of Rochester and was first presented during the Greenback Competition. Since then it has been under continuous development and has been tested extensively in the company and by the Vermont Military Committee for service.

R.C.A. Receivers

Two new models embody many improvements

Two types of radio receivers with more than 100 AVR-7 and AVR-7-A receivers have resulted in the development of the AVR-7B and AVR-7C models recently announced by RCA. The two new receivers are no-load heterodynes and both cover the 200-400 kc. frequency band for heterodyne and carrier reception. Their essential difference lies in the second band which in the AVR-7B, is 750-1,500 kc. (broadcast intermediate)

and, in the AVR-7C, is 2,200-4,700 kc. (intermediate wave).

The circuit used in these models includes a self-excited power supply (full-wave electronic rectifier, power transformer and filter) which operates from the aircraft battery; a remote control system using high voltage and an automatic tuning scale; and an expanded frequency range.

The receiver has low power consumption is due in part to the multi-tube RCA Radiometer of which there are used and develops the same features as the previous model. Only a small antenna is needed and the standard aircraft antenna wire or single wire "T" type (longitudinal or transverse) are recommended. Special input filter circuits minimize sparking requirements and a single switch controlled static limiter reduces interference from natural causes.

Dimensions of the receiver are: thickness 5 1/2 in. high, 4 1/2 in. wide and 10 1/2 in. long and the control panel face is 5 in. wide by 6 1/2 in. high. Weight of the complete equipment (including remote control cables, two cables, control panel, headphones and plug) is 25 lb.

Lean-O-Phone

New transmitter is compact and light in weight

In view of the plans that ended over the "Lean Vary" on her first arrival from Bill Lear, president of Learco, describing the event for subscribers over the Mutual network. The transmitter is the latest Lean-O-Phone Model L-15 which has just been announced by the company.

A compact unit weighing only 12 lb. including dynamo, the Model L-15 has an output of 15 watts, 100 per cent modulated. Total battery drain is 11 amp at 12 volts. Frequency is crystal controlled and is determined by plugging in the appropriate quartz crystal for any point in the range of 2,000 to 7,000 Mc/sec. New beam power amplifier tubes are used and can be obtained in any well stocked radio store. A push-to-talk microphone, completely adjustable in flight is a feature of the set. The transmitter and dynamo are 8 1/2 x 5 x 7 in.

In order to match the electrical properties of the transmitter to those of a trucking unit antenna whose effective length may be determined due to bending or whipping in flight, all Lean transmitters are now provided with an antenna using constant length or remotely controlled. This arrangement provides maximum reflection for the variations in length of the antenna which are inevitable in the use of trucking wire antennas.



AVR-7 receiver and control panel



Model L-15 Lean-O-Phone

ON DUTY

Wherever the Navy goes, there go the Corsairs—faithfully performing their important functions in the Navy's program of National Defense.

Vought Corsairs



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DIVISION OF UNITED AIRCRAFT MANUFACTURING CORPORATION

News of the Month

Highlighting recent events in the aviation world.

Elmira's Annual

Seventh Annual National Soaring Contestants compete for \$4,000 in prizes

ELMIRA, annual meet for America's gliding and soaring enthusiasts, the year played host to the seventh annual National Soaring Contest. As we go to press, no spectacular flights have been made, with the exception of a new altitude record of 6,615 ft., made on the meet's seventh day by Emerson Mallock, of Wyandotte, Mich. This compares with Richard C. du Pont's national mark of 6,375 ft., set in 1934.

Most exciting prize this year is the \$3,000 put up by A. Pilot du Pont, at least \$2,000 of which will be awarded. Half of the money, \$1,500, will be awarded on a point basis, with \$500 reserved for the first altitude flight of the meet to break the record held by du Pont. If no one else had the luck to reach 10,000 ft., the prize would jump to \$1,500. The Vincent Blackie prize of \$500 will

go to the pilot flying the greatest distance, and will be increased to \$1,000 if the national record, set at 128 miles by Richard C. du Pont in 1934, is broken.

Contestants so far for both scheduled performance prize at Mallock, who on the same flight which set the altitude record soared 17 miles to Orono, Pa. Many-made conditions at Elmira are better this year than ever before. In addition to Harco Hill, traditional soaring site, there are four other hills which can be used for launching, permitting flights almost everywhere at the discretion of the wind.

Dr. Karl O. Lang, meteorologist at Harvard's Blue Hill Observatory, and a vice-president of the Soaring Society, has taken over charge of the meet, as chairman of the contest committee. An innovation this year is Dr. Lang's use of radio-equipped balloons for recording when air temperatures and winds. The balloons are released from the valley below Harco Hill, and send back instantaneous temperature readings, which are then flashed to the top of the hill for comparison with conditions prevailing there.

Two German-built airplanes are being flown this year, one by du Pont, and the other, which has just been acquired by the Elmira Association of Commerce, by Yvonne Stetela and Wolff von Westendorff. Most active day in the first game was June 26, when 23 gliders and sail planes—the total entry 336—were in the air at the same time.

Blind Landing

Naval aviators test new system at Indianapolis meeting.

On June 5 officials of the Air Corps, Bureau of Air Commerce, Bureau of Standards and representatives of the aviation met with the Blind Landing subcommittee at the Radio Technical Committee, Bureau of Air Commerce, to witness the first comparative tests of five types of blind landing aids installed on the Indianapolis Naval air-
Photo by



GOPPINCEN I

At Elmira, Richard C. du Pont competes for his ninth flight of his new "Gosport" built airplane at the Soaring Society's seventh annual meet.

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SPECIALIZED designed to withstand the vigorous use encountered in training Air Corps Cadets, the *Severely Trained* is an outstanding example of the use of Roebbling Aircraft Cord. The superior flying safety is assured by this Wire Aircraft Cord—the result of Roebbling's 90 years of specialization in the manufacture of wire and wire products. Thus, you will find it is the choice of practically all the principal plane builders.

Roebbling Wire Aircraft Products include—
Tinned Aircraft Wire, 19-wire Aircraft Steel, Tinned or Galvanized Aircraft Cord (50x, 75x, 75x15), Tinned and Galvanized Ferrule and Thimble String and Lashing Wire, Control Sides and Cables, Power and Lighting Cable, Welding Wire.

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Alpcon. Both the Department's aerial bus and the Army's directional beam-illumination system have been modified, and the military models' calibration units of both types to determine the one best adapted to transport use. Demonstration flights were made by Bernard H. Gellius of the Department of Commerce.

In the course of the day's meeting Irving R. Maltby of the Bureau of Air Commerce described a new type of blind landing system on which he has been working for many months. Maltby's system, reduced to its simplest form, consists of the installation on the ground of three stations of radiobeacons—light radio units and/or searchlights. The three radiobeacons are laid out in a triangle in the form of an equilateral triangle. The radiobeacon which forms the apex of the triangle is placed on the center line of the runway at ground level. The other two corners of radiobeacons form the base of the triangle, one disposed to the right and to the left of the edge of the runway in the direction of the approach. The radiobeacons are placed on the ground sufficiently so that the normal glide path to the surface lies in the plane defined by the three radiobeacons. Then the pilot, approaching from the proper direction and at the proper angle sees (directly,

or on a ground glass screen or front of lens) three spots of light in line, horizontally and equally spaced. If the approach is made from an improper direction, laterally or vertically or both, the lights will fall into some slanting pattern which will yield a clear indication of flight correction to be made. Whether or not the pilot sees the three lights visually through his windshield or whether the radiobeacons are picked up (optically or electronically) and transmitted into three spots of light on a ground glass screen on his instrument board, the three-prototype method remains the same. The direct light-to-eye system lends itself well to the problem of landing flying hours on water at night. The radiobeacon (radiobeacon nearest board) system offers a means of making blind landings through fog.

Most important of the innovations of the system is that all of the information necessary to make a blind landing is contained in a single instrument. There is nothing to read. The answer is coded (optically, electronically or otherwise) that the pilot looks at a picture of lights placed on the ground in such manner with slanting lines to make landings according to common visual practice.

Schedules, Traffic, Records

United passes 100,000,000 mile mark; TWA moves its Los Angeles terminal, American to stop at Providence

UNITED AIR LINES passed its 100,000,000 mile mark June 7 with Pilot Lewis J. Givens, Jack Kalbfelt, and H. Swanson Low at the controls on the final Los Angeles-San Francisco run. The total was accumulated over a period of ten years since United's first flight began in 1918.

To meet space to meet time demands, United President W. A. Patterson has announced that the line will lay down 15 to 25 of the four engines, 40 passengers, Douglas being developed, jointly by five airlines.

The Interstate Commerce Commission, on June 6, ordered the suspended jet schedule proposed earlier by the ex-

ecutives (AIRWAVE May, 1958) for NORTHEAST AIRLINES.

May 28 TWA moved its Los Angeles base from Civic Center to Terminal, Glendale, to Civic Air Terminal. The bank of lights No. 1 will be used for business and night operations, and night operations and dispatchers' offices will be in the New Adams, built by the terminal at a cost of about \$250,000.

A few days after Attorney General Cummings had announced that the long-awaited Bureau Report on 1958's aircraft manufacturers would be delayed pending a decision on "possible litigation," the Post Office Department announced that criticism of the sale of Air Mail, American, Northeast, TWA, and Western Air Express united units, aggregating \$9,581,094 for \$104,311, which represented record savings as indicated by the presentment point in the official line at the conclusion, plus the return of performance bonds which had been posted.

With the opening of the Rhode Island State Airport at Narragansett, AIRCRAFT FINANCIAL NEW YORK Providence and Boston Providence service. Three round trips a day are made between New York and Providence, one of them continuing on to Boston.

With the approval of the Post Office

Traffic

Latest available statistics from the Bureau of the Commerce and the Post Office Department—Domestic flights only



Department, Thomas Fortune Ryan, III, has purchased 51 per cent of the stock of Hawaiian Airlines.

ALL CENTRAL planes registered in Cleveland are serviced by General Aircraft Corp., which assumed its new duties June 1.

The ICC has set July 12 as the date for hearings on AIRWAVE's complaint against AIRWAVE. The ICC's plan for more rail pay will be heard the same day.

Copeland Reports

Senate committee recommends "stronger overhaul" of Bureau

THE CASE OF TWA's Flight 6, which killed Senator Copeland at Ketchikan, Me., a year ago last May, ended the Bureau of Air Commerce's 902 pages of involvement, which failed



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Many aviation concerns have simplified their maintenance problems with the help of Sherwin-Williams engineers. American Airlines, for one has adopted 100 per cent the Propaganda Machine



service Plants and Painting Service of the largest paint company—Sherwin-Williams. B-W paints cover the fuselages, tailfins, and other structures of American Airlines in 20 other Good paint protects A's equipment and makes for more efficient shop work.

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down to a statement of five "probable contributory causes." On only one count—weather prediction—was the government found at fault.

Also resulting from the crash was action by the Senate. S. Res. 146 put Senator Joseph E. Copeland at the head of a subcommittee of the Committee on Commerce, handed him his orders to conduct a quadruple-barreled investigation of the crash in particular, relative safety in general, the safety of the Bureau, and the personnel of the Bureau. Late last month, tucked away in the Congressional Record in the role of a postscript, the Copeland Committee preliminary report was published.

The Copeland report differed from the Bureau's findings in that it blamed failure of three Federal aids: the Kansas City tower, the Keweenaw tower, and the Keweenaw beacon light.

Regarding the investigation of the Bureau itself, the committee found Director Vard possessed of the necessary aeronautical experience and background for his job, but was lacking in business experience. They found him "an amiable person . . . One fear is that he is too amiable, that he is lacking in iron, power, and the determination to keep the employees under his direction from becoming unruly to his subordination."

Strongest language used in the report was directed against Ben Martin, Chief of the Air Navigation Bureau. The committee condemned him "professional equipment and preparation," suggested "a larger role in needed."

General commendations were made that the Secretary of Commerce thoroughly overhaul the Bureau of Air Commerce with a view to improving its administrative officials.

Men, Motors, Money Engines for Taylor; Severely to issue stock

With an order backlog of more than \$100,000, LOCKHEED AIRCRAFT CORP., Burbank, Cal., has taken its option on last building Union Air Transport, and plans to meet buildings providing from 300,000 to 125,000 sq ft of additional space. The plant employs 600, and more men with technical training are needed. Eleven twin-engine ships—Lockheeds and the new Lockheed 12—are in order. During the first four months of this year eight planes, costing a total of \$400,000, were delivered.

Ball Aircraft Corp., Buffalo, has about 600 men at work on contract and wing plants under its \$200,000 contract with the Coastland Aircraft last February.

CONSUMERS AIRCRAFT CORPORATION has leased an additional 90,000 sq ft of land at its San Diego factory. Additions, to cost about \$300,000, will consist of a large addition to the main plant and four new buildings.

Mexican reports orders on hand for the year running ahead of last year's total. About 100 of the C-4 "Prairie" 125 hp engines are being shipped per month.

REARVIEW AIRPLANES, Inc., has moved into larger quarters at Fairfax Airport, Kansas City, Kansas. An order for 400 Continental 37 hp motors for installation in C-4s has been placed by Taylor Aircraft. The company will spend \$25 per motor in an effort to jack horsepower up to 40. With the demand for C-4s running ahead of the supply, that company will start on more plants in the first six months of this year than were produced all last year.

SEVERELY AIRCRAFT has filed a registration statement with the Securities and Exchange Commission for the sale of stock which will net the company more than \$100,000. The firm "is contemplating of new business" that work was already secured in the recent Army order for permits.

The Bureau of Air Commerce has approved the self-binding terms thereof of the DANIEL T. THORNTON CORPORATION for use in limited aircraft production. The parts are fabricated from material specified by the aircraft manufacturer in its approved technical data.

The Bureau of Air Commerce reports a 53½ per cent gain in aircraft production during the first quarter of 1938 compared with the same period last year. 456 aircraft 340.

Leases in passenger Bushcraft in Japan has been granted Japan Air Transport Company, of Tokyo, by the Bureau of Air Commerce at Walling, Kan. A C-12E Bushcraft has been ordered by the Japanese ministry.

Pursuits, Bombers Severely, Northrop, Wright, Curtiss orders total 266 planes

The first of several new service orders, announced by the Navy called for 191 dive bombers and scout bombers, but the Navy did not reveal prices. Report states—20 two-place scout bombers (VS-3)—order to Curtiss Aeroplane & Motor. To Northrop went a contract for 54

dive bombers (VB). The remaining 34, also of the dive bomber (VB) type, went to Curtiss-Wright.

The Army order, for June 10, was for 77 engineless pursuit and spare parts equivalent to eight more. It was to Severely—dive bomber in the present stage competition at Wright Field in which Curtiss, Chance-Vought and Consolidated are bid against. The contract price, has agreed, was \$1,050,000.

Power for all the plans, both Army and Navy, will be supplied by Pratt & Whitney engines; for the Navy, 200 hp Twin-Wing Junior; for the Army, the new 1,000 hp Twin-Wing. Propeller requirements will also be standard for all 200 hp. Hamilton Standard Constant Speed.

Financial

New Douglas issues American to issue equipment trust certificates

WITH CONTRACTS for 161 planes from the Navy, American Airlines and United Air Lines since the first of the year, Douglas Aircraft needs working capital. To secure it, the company, on June 10, issued \$1,000,000 of American Airlines and Douglas Aircraft Corporation, proposing the issuance of 50,000 shares of capital stock at 20 per share. The shares will be offered to present stockholders at the ratio of one to each five new bond.

Consolidated finished the first quarter of this year with a profit of \$175,000. AMERICAN AIRLINES, in finance purchase of its twenty new Douglas DC-3s, plans to enter a field new to the aviation industry: equipment trust. The equipment trust certificates, to be bought for the \$25, will approximate \$1,000,000—60 per cent of the cost of the plane. They will be amortized, at a yearly interest charge of 3 per cent, in 100 weekly installments, to be paid by the lessee, with all about \$30,000 per plane per year.

American will receive assistance in purchasing its new Douglas—new and above the SPC loan—from its parent company, Aviation Corporation. The firm's financial statement shows a loss of \$248,125, compared with a 1936 loss of \$248,125.



HAMILTON STANDARD'S proposed new plant in its addition to the existing plant, calling for annual production of 2500 propellers each 1000.

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Extensively used on modern military and transport planes because of their positive action, simplicity and ease of maintenance.

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Historical

1900, the first pilot based on the Rene Tampier 1/2 May wing system. The historic first show on the machine on the road three years ago in the investment the Electric engine controls.

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At the Bureau Review

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the fabric that had been conforming to these new standards since it was first produced, nearly three years ago.

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ROCKWELL FIRM GEAR

distancing and upgrading of the Department of Commerce intramural field at New Blackhawk. Secretary Elverson and Richard M. Depue, Jr., Roosevelt Field, Mineola, report the sale of the new Fordfield 24 in two days.

The WPA has received \$60,000 for improvements at Harris Field, Lakeland, Fla., and for a large office building, grading of the 2000x400 ft. glider runway, acquisition of a glider hangar and five cottages for the accommodation of visiting glider pilots.

Leach Aircraft, Inc., Anderson, Ind., purchased a glider powered Fordfield 24.

Ford Williams is now associated with George McCauley in Aeronautical Radio Company, Roosevelt Field, Mineola. The company is distributed by RCA and Western Electric radio equipment.

NORTH CAROLINA—The Carolina Aero Club held a meeting and air show at Kinston Airport early in May. 44 planes were on hand. Maj. Al Williams and his Goldhawk won the stars of an air show and model contest sponsored by the Kinston Flying Club. Joe Williams is in the air.

The Carolina Chamber of Commerce is buying plans for the dedication of Lenoir Field after completion of the WPA improvement project.

OHIO—General Aviation Corporation, Cleveland Municipal Airport, has been designated as approved aircraft engine overhaul station by the Bureau of Air Commerce. The company, headquartered in the old American Airport hangar, is sales and service agent for Wright, Lycoming, and Menasco engines, Smiths equipment, Hamilton collection, Rotax engines, and G. G. items. The Western and Wisconsin Chambers of Commerce are formulating plans for a 1955 joint county airport at Vienna. An air show sponsored by the Cincinnati Post drew 25,000 spectators to Lenoir Field late in May. The Independent Airport Operators Association has been formed at Cleveland Municipal Airport by the centers of private airports at the field. Officers: J. W. Horton, president; Robert Hughes, secretary; and Don Patrick, treasurer.

OKLAHOMA—The Oklahoma City Aviation Club and the Tulsa Aero Club sponsored the Oklahoma State Air Tour, scheduled for June 11-12-13. The itinerary included 32 cities, and was expected to draw about 40 planes. The Boone-Yong Aviation Company has leased the old TWA hangar at Tulsa Municipal Airport.

OREGON—The WPA is spending \$1500 for the construction of air markers in more than 100 forest in Oregon. The Forest Service Association of Eugene was to be built to

the Sportsman Pilot Association of Portland late in May.

PENNSYLVANIA—At an airshow at Lancaster Airport late in May, Buddy Bunker Bush, a glider pilot, took part in a glider race. The WPA will spend \$50,000 on an improvement project at Worthy Field, Waterbury, Conn. Plans call for grading and construction of three runways from 2,500 to 3,200 ft. long. Al Leach, manager of VANDERBILT Airport, has bought a 10-second Stinson for passenger flying. The Leach Flying Service has been appointed distributor for Aeromax planes.

RHODE ISLAND—More than 100,000 persons were on hand May 30 and 31 for the reopening and dedication of the proposed State Airport at Westerly. The dedication was in conjunction with Rhode Island's Tercentenary, and the program included a wide variety of exhibits and staged events and parachute jumping, including flying exhibitions by Col. Robert Turner.

SOUTH CAROLINA—A \$500,000 WPA project at Florence will provide the airport with a new hangar and concrete runways. Seven airports in the State are being constructed or improved, and many others are pending, under the WPA airport improvement program. Grading work at Greenville Airport is about half finished, and 150,000 cu yd of rock has been moved.

TENNESSEE—The Air Corps gave a two hour show at Lenoir Field, Chattanooga, early in May. 6,000 spectators turned out for the show.

TEXAS—The State Airport has authorized a \$40,000 warrant issue for the purchase of an airport site. 36,000 of the total would be used as sponsor's contribution to place an allocation from the WPA for improvement work. Lufkin has voted to buy a 120 acre airport site for \$75 per acre.

UTAH—Wynne B. Ferrie, manager and instructor of the Anasazi Flying Service, Ogden Municipal Airport, announced that the company has bought two additional planes: a Taylor Cub for student instruction and a two-place cabin ship for charter work. Ferrie's assistant at the field is John Park.

VERMONT—The Bureau of Air Commerce is considering establishment of a radio range beacon at Rutland. The airport at Montpelier was dedicated early in June.

VIRGINIA—Harold P. Galt, Jr., is seeking permission from the city of Staunton to conduct a flying school

and to charter work from the municipal airport. The WPA has started to build a new \$15,000 for landing, taxiing, grading, mowing and landscaping at Preston Glenn Municipal Airport, Leesville.

WASHINGTON—Traffic control lights are to be installed at Boeing Field, Seattle, at a cost of over \$10,000 to \$20,000. A National Aviation Planning Council was held in Spokane May 26 and 27 to discuss the aviation problems of the northwest.

Schools

The Boston School of Aeronautics, Danvers, Mass., and California, Calif., has announced a new Airframe Drafting and Meteorological course. It will require 600 hours of lessons, and only mechanical or mechanical engineering graduates of an accredited engineering college are eligible.

The Carter Jones School, or Aero-Mechanics, Newark, New Jersey, has placed 75 graduates in jobs in the industry since the first of the year.

PURVIS AIR COLLEGE, Kent St. Louis, Mo., has announced it is preparing for the purchase of a two-engine plane for student instruction.

The Joan Jones Air Service, Lancaster Municipal Airport, Lancaster, Pa., announced the purchase of three new gliders. More than 100 students of the Western Section or Aeronautics, Los Angeles, Cal., have completed the first of the year.

FLYD WRIGHT has been made club instructor at the Elmer Martin Airport, Santa Ana, Cal. He has started the Flying Wings Flying Service, and has 80 students enrolled, taking instruction in an Aeromax and a Stinson. Whitney George, manager of Lenoir City Flying Service, Portland, Ind., has bought a two-place Raytheon Sportster. The Kansas State Aircraft School, Philadelphia, Pa., will give five weekly Saturday night broadcasts, interviewing prominent people in the aviation industry.

Wichita Falls, Tex., has established a three school at the new Valley Airport, Palmer, Miss. John H. Stiles, of Denver, Ariz., and Denver Airport, Mo., reported twenty new students have enrolled. Alfred H. Ladd, school is in charge of student instruction.

Louisiana State University has purchased a new Fordfield 24, which will be used at the University's field, New Orleans.

Gaines Flying Service has opened a three day 40 mile west of Mansfield, Ohio. Glen Galt will be in charge of student instruction and charter work.

Person of Air Commerce in connection with its aerobusiness specifications. The technical department of the aviation factors will cooperate through the Engineering Committee. From 1917 to 1927 Mr. Clayton was associated with the Eastern Airplane Company, then joining the airplane division of Ford Motor Company. He was engineer with Atlantic Aircraft Corporation at Hawthorne Heights, N. J., building P-10's; in 1929 became assistant chief engineer of Miami Aircraft Corporation of Cincinnati, later moving to similar capacity for Pottsville Aircraft Company. Owing to his long appointment he was engineer in the Bureau of Air Commerce.

At the close of the college term, Patterson, Pass D. East, Jr., director of the Air Line Institute of Northwestern University, will make his headquarters in Washington to influence the re-organizing of the Department of Commerce aircraft regulations. Prof. Pass was appointed to the task by the Bureau of Air Commerce and will devote the summer to its execution. He acted as legal adviser in the Federal Aviation Commission when that body prepared its report in February, 1937.

Aviation people visiting this country from abroad: Dr. J. Bonnier, French instructor of army radio direction, formerly with R.A.F. Here, on patient manner, also to look over latest airfield construction.

COMMANDEUR MARIETTE DE LA SERRA, a New York hotel complaining his son duty on the Spanish school ship Juan Sebastian Elcano. In service with the Spanish navy, Comandante de la Sierra has been in charge of the Naval Aviation School at Barcelona, also served as the head of naval aeronautics equipment for the Spanish navy aviation. VIZCAINOS, CARMEN L. J. WARDEN of the Royal Australian Air Force (R.A.F.), and Sergeant LESLIE HARRISON and WILSON, comprising a special commission investigating civil and military aviation equipment, visited the United States following a several weeks tour of the aviation industry in Europe.

Dr. IAN REICHELBERG HORTON, technical director of Henschel-Paggenmeyer, and Leo E. ECKHART, superintendent of the United Engineering staff, making a trip through the States to visit important industries and to study metal aircraft production.

COMMANDEUR PIERRE FLORENTIN, now chief director of Pignatelli & Company of Italy, producers of aircraft motors. . . Captain HERRING, co-owner of L'Espresso L'Aeroplano, made the round trip on the Hindenburg in June, "just for the ride." . . OTTO J. MEIER, Director of West Publishing and one of the organizers and former director of Lufthansa, paid a two-day visit. SCOTTISH COMMANDEER JAMES BURN, director of Supermarine Aviation Works and Vickers in England, also on a brief visit.

Side Slips

By Robert R. Osborn

MRS. HARRIET HAGUE, 86-year-old, passenger on the first eastward flight of the dirigible Hindenburg, returns home reporting the trip to be very pleasant, but too quiet and uneventful to be thrilling. The Hindenburg quips her: "No one has any secrets about a dirigible. The engines make no noise and there is slightest vibration in the cabin. The passengers are not sound-proofed and everything that is said in the passenger quarters can be heard distinctly."

This certainly is a serious complaint and should be considered by the Zeppelin



Company. They should at least sound-proof the sleeping room for the traveling salesman.

AN AN ASSOCIATED PRESS dispatch informs us that the French are following the lead of the Russians in developing companies of soldiers who will jump by parachute behind the enemy lines. "The jumpers, selected for five-year periods, will be paid the annual salary of 2,000 francs, or \$120 a month. The ordinary soldier gets a day plus some tobacco and wine."

We wouldn't be surprised even if they offered to 2,000 francs and the tobacco and wine.



FROM HEARING to some of them we had the impression they had even less training than that.

We ask by the papers that an expert trigger is being flown around the Mexican countryside to be aimed to kill off the great numbers of wolves. These wolves are destroying so many of the native rodents that the Mexicans are without food except that provided by the government.

You'll probably be glad to learn that at least the wolves of this country are not so silly.

THE BUREAU of Entomology and Plant Quarantine in Washington has recently purchased an airplane to be used in "bug chasing." The most success of

the Antwerp Company in eliminating some of the "bugs" from their designs indicate that the machine should be very successful in this service.

At the recent meeting of the Society of Automotive Engineers at White Sulphur Springs one of the speakers stated that the car of the future "will not run on the highway alone. It must fly in the will of the driver or when special speed is required it must take to the water at the speed of the island lily."

This will probably result in the solution of the Green House Problem. He won't be able to get jump from the wild deer even by climbing a tree or jumping off the dock.

A New York State man who just passed his 100th birthday, recently took his first airplane ride and liked it. He was born in a big cabin on the steam ground on which the locomotive now sits.

Always lived in the same place and has been away from home only one night in his life. He is a bachelor and has never used tobacco or liquor. He says he has no fears for a long life.

However, he has the right formula for making any length of life seem long.

A REVIEW of United Airlines states that in proportion to size, Reno, Nevada, leads the whole wing in percentage of air travel. The business seems to be fairly evenly divided between couples wishing to take advantage of the modern marriage law and married people equally anxious to enter the right order.

THE MANY diverse regulations. Thus the enforcement of aviation would seem to give the authorities of marriage an even break, allowing couples to get into it, and out of it, loose.

THESE conditions pose of Eastern Airlines are now carrying wooden models of airplanes in the air to show the fit and maintenance of these airplanes. We are anxious to know if the system has been successful. We know a number of designers who would like to use the same scheme for getting rid of the "bugs" in their airplanes.

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RADIO

IF, AS far as safety is concerned, there is any one element in the aviator's air transport picture that is more important than any other, it is proper communication between the ground and aerials in the air. Even in the best of weather, the maintenance of contact with ships on the air is highly important. When the weather closes in it is absolutely essential.

Contact with aerials in the air is becoming more and more important, especially in the vicinity of airports, as the airports become more crowded. This fact has given rise to the development of relatively short range transmitting sets designed for control of arrivals and departures. There are, therefore, two general types of airport radio equipment offered today for two distinctly different purposes. The first is for long-range ship-to-ground or point-to-point communication. Typical of equipment of this sort is Western Electric's 480-watt transmitter (14-B) which will deliver 400 watts of carrier power at frequencies of 2 to 12 megacycles, and 200 watts at 12 to 16.1 megacycles. This unit has two crystal controlled frequencies available, anyone of which may be selected by operating a standard telephone selector dial. This unit is arranged for remote control.

RCA puts up a unit for mobile purpose, the Model AVT-4 airport radio communication transmitter with an output of 125 watts on any three crystal controlled pre-selected frequencies within the band covering 4,200 and 6,500 kilocycles. Three types of antennas may be used, CW telegraph, MCW telegraph, or telephone. The unit operates from 110 volt a-c single-phase power. A similar unit, with the three frequencies but with 25 watt output is also available.

For traffic control purposes within short range of the airport, specially designed transmitters are available. RCA's Model AVT-1A (crystal controlled on any pre-selected frequency between 200 and 418 kilocycles), and Western Electric's Model 12-A transmitter (10 watts output, crystal con-

trolled, frequency range 340 to 560 kc) are typical. The Harvey 250-F transmitter (with crystal controlled frequencies from 1.5 to 7 megacycles) is another example.

As comparative prices to the transmitting equipment detailed, the companies listed manufacturers receivers which are suitable for long or short-range contact with ships in the air and for point-to-point work. The RCA general purpose receiver model AVT-5A (distorted (4)) provides two distinct bands between 150 and 18,000 kc. It employs a 5 tube superheterodyne circuit and operates on 100 or 220 volts 60 cycle single-phase AC. It has a maximum output of ten watts, undistorted output, six watts. It is built especially to emphasize the best and clearest of tropical climates. An 8-inch loud speaker is built in.

Western Electric's receiving equipment (models 11-A and 11-B) are designed especially for airport use. The 11-A is continuously tunable over a frequency range from 2,750 to 6,500 kc. The 11-B has two band-pass and pre-selected crystal controlled frequencies. Each unit are mounted in self-regulating cabinets and use separate loud speakers.

A wide range of air remote controls, special microphone arrangements, etc., are also available. Certain of the manufacturers listed do not offer airport radio equipment out of stock items, but are prepared to fill special requirements on order.

Radio

General Electric Company, Schenectady, N. Y.
Harvey Radio Laboratories, 11 Bayview Street, Fort St. Louis
Low Communications, Inc., New York, N. Y.
RCA Manufacturing Company, Inc., Camden, N. J. 102 110
Rushmore & Sons, Inc., Boston, N. J.
Western Electric Company, 120 Broadway, New York City 411, 414
Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.



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HANGAR

EQUIPMENT



1



2



3



4



5



6

THERE isn't a problem in the building of a hangar as such, usually among side evidence. Hereafter the wing open at most of our aircraft have been such that there has been no particular difficulty about obtaining structural steel buildings of ordinary industrial type to house them. Except one of course, has been the very large hangars built at Alton and in St. Louis to take care of large rapid airplanes. Usually, however, designers are beginning to think in terms of wing spans far and away in excess of previous dimensions. As suggested elsewhere in this issue, we may come to the point where exceptionally large spans must be covered out of doors and given no paint cover, simply because it will be impracticable to provide hangars with sufficient clear span to take care of them. As an indication of the trend, Douglas has been forced to build a hangar with a clear span of 200 ft. This should take care of aircraft for some time to come but clearly the construction of such buildings is very expensive.

For housing smaller airplanes there has been a revival of interest in so-called hangars. Taylor Aircraft at Bradford, and a number of the American country clubs have gone in for this type. A few wooden hangars with wood and trusses of relatively short spans are still being built, but modern hangars specifically call for brick and steel with concrete floors, adequately lighted and with good fire protection.

A number of companies (see list) have been specializing in more or less standardized building plans for hangars. Specifications are generally sim-

ilar to those written for ordinary industrial housing. Primary requirement, of course, is large door opening. Desirable also is plenty of window such area. Unavoidable are the built-in "protected" inside. Ordinary corrugated steel sheds require considerable maintenance and constant painting, but the protected inside, although higher in first cost, show savings in maintenance. The H. H. Robertson Company specializes in this particular type of building material.

For wide, clear spans, doors are always a problem. Several types are in use, perhaps the most popular being the rolling type in which relatively short individual panels are mounted on rollers and trucks, and may be pushed back out of the way against the side walls, actuated by means. Other types of doors in common use include the canopy style which swings upward and outward as a unit, or the vertical lifting type, similar to garage doors.

Hangar heating is often a difficult problem because of the large cubic content of hangars, and also because doors must be opened to heat exhaust properly. For this reason, most heaters with blower attachment seem to be well adapted for hangar use. There is a positive correlation of heated air and prevent the thermal stratification that occurs when heating by radiator only, where the hot air rises and stays close under the roof and the cold air flows across the floor just where mechanics are working. Various types of coil heaters are available, some for direct mounting others designed for suspension along walls or

to roof trusses. These forced circulation heaters are also useful for solving special problems, such as keeping airplanes warm, etc. By attaching suitable nozzles or flexible ducts to the heater a stream of warm air can be placed wherever required. In industry alone and heaters may give some cooling effect by circulating dry air.

The problem of a heater for the heating system is too broad to be discussed here. There are no special hangars that distinguish a hangar heating heater from any other industrial heating type.

Good lighting is essential for accurate work. Some operators prefer lighting from high walls by means of small flood lights, two examples of which appear on the page. Side wall flood lighting has the advantage, of course, that light is thrown under the wings of planes standing on the floor, whereas if lighting is overhead, shadows are cast under special attention is paid to selection of reflectors, etc. The Cooper Aircraft building type of one-story hangar is well adapted to hangar use.

As it is seldom possible to get enough illuminated lights from fixed installations, an special job, every hangar should be provided with plenty of skid-proof surface both along the wall and in the floor, for the movement of movable flood spots or movable lighting equipment. Incidentally, too, it is a good idea to install prewired conduits at frequent intervals in the hangar floor so that dogs may be electrically grounded while they are being serviced or stored.

For the safety of field personnel or visitors, adequate lighting is necessary around hangars and field boundaries. A

number in the concerns listed here under a special study of airport requirements and are in position to furnish every type and other types of lights for the airports.

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Buildings

AIRCO-PRATT 350 Company, Danville, Va. (3)
Aircraft Company, Cleveland, Ohio, (4)
Beech-Kemp Company, 901 Newark Road, Middleburg Heights, Ohio
COWI Inc., 1015 10th St., Long Island City, N. Y.
International Aircraft Corporation, 1015 10th St., Long Island City, N. Y.
International Aircraft Corporation, 1015 10th St., Long Island City, N. Y.
International Aircraft Corporation, 1015 10th St., Long Island City, N. Y.
International Aircraft Corporation, 1015 10th St., Long Island City, N. Y.

Heaters

American Steel and Wire Company, 1015 10th St., Long Island City, N. Y.
Aircraft Company, Cleveland, Ohio, (4)
Beech-Kemp Company, 901 Newark Road, Middleburg Heights, Ohio
COWI Inc., 1015 10th St., Long Island City, N. Y.
International Aircraft Corporation, 1015 10th St., Long Island City, N. Y.

Windows

American Steel and Wire Company, 1015 10th St., Long Island City, N. Y.
Aircraft Company, Cleveland, Ohio, (4)
Beech-Kemp Company, 901 Newark Road, Middleburg Heights, Ohio
COWI Inc., 1015 10th St., Long Island City, N. Y.

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Lighting

Crown-Rohde Company, 1015 10th St., Long Island City, N. Y.
General Electric Company, 1015 10th St., Long Island City, N. Y.
The Photo-Optical Company, 1015 10th St., Long Island City, N. Y.

Sanitation Systems

General Electric Company, 1015 10th St., Long Island City, N. Y.
The Photo-Optical Company, 1015 10th St., Long Island City, N. Y.

Air Compressors

American Engineering Company, 1015 10th St., Long Island City, N. Y.
The Photo-Optical Company, 1015 10th St., Long Island City, N. Y.
The Photo-Optical Company, 1015 10th St., Long Island City, N. Y.



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TRACTORS

Tractors

The Baker Building Company, Cleveland, Ohio. (2)

Columbus Tractor Company, Porto, RI (3)

Clark Tractor Company, Middle Creek, Mo.

Cleveland Tractor Company, Cleveland, Ohio. (1)

Kearney Mfg. Company, Dubuque, Iowa. (4)



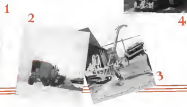
Other closely related airport machinery includes power units, cranes and trucks. In isolated locations, diesel-powered generator sets are frequently used to supply electricity for field lights, radio communication, refrigeration and other electric power applications. Four diesel generator sets were purchased by Pan American for these uses alone.

A new electric crane truck, recently developed, has been used extensively at airport work. This type of truck travels to air job whether it is in the hangar or at some remote point on the field and is capable of carrying repair parts, spare engines, or other necessary equipment. The load is so directed that quick and accurate alignment of engines with their mounting rigs is possible and the crane can be furnished with jacking legs for handling planes or moving other loads for museum collection.

A wide variety of graders, compressors and other similar equipment is available. Another useful tractor attachment is a revolving boom for light snow or refuse clearing. Snow removal equipment is usually of the plow variety.

A good example of a tractor designed especially for a specific job is the Baker Building electric (4) which was developed for handling Boeing 247's in United Airlines hangars. This machine was built close to the ground so that it was just completely under wings and tail sections.

A newly developed machine, Semi-go (2), picks up the snow and discharges it on the form of a fine mist at the tail of the runway. This equipment is in use at several airports where extremely severe weather is frequently experienced. The plow type, mentioned above, is at much more common use. Frequently, wing blades are used to increase the width of the path plowed. It is usually good technique to begin a wheel's plowing with very wide spaced strips that, as successive strips are plowed and the runway tends to get narrower and narrower the wheel tracks will end with closed strips still wide enough to be used safely. Another method consists of packing the snow down with heavy rollers instead of removing it from the runway. Thus, as the winter progresses, runway levels are raised higher and higher, ending up previously in strips of solid ice. The roller method, however, has not found widespread acceptance, and airports in the snow belt should consider some form of plowing equipment as essential.



"Just 20 Years Ago"

WITH its August issue, Aviation will have reached out exactly twenty years of service to American aeronautics. The real significance of this anniversary, however, is that it marks the twentieth birthday of American aviation as a modern industry.

For it was in 1916 that the pioneering efforts of a small group of struggling manufacturers were first recognized by the United States Government with production orders for military planes.

The brilliant achievements of these early constructors laid the foundation for American aviation as it is today, and we can think of no more appropriate way of celebrating our own anniversary than by telling the story of the men and the companies who have contributed so much to the building of this modern industry.

Cooperating with us to make this two-fold anniversary noteworthy are many of the pioneers who themselves directly contributed to the record of progress.

The men who will carry forward America's splendid aviation traditions will find in this record of technical advancement—of almost insurmountable difficulties overcome—much of inspirational value and permanent interest.

For all American readers the August issue will, we believe, record an epic of accomplishment of which they may well be proud.

AVIATION for August

MISCELLANEOUS

A REPORT equipment in its broadest sense covers a list of inventory. In top dimensions of it, it would be proper to include items and highway machinery, building materials of all kinds, technology for office buildings and homes, electrical equipment, and a large number of specialties. The most important of these classifications have been covered elsewhere in this issue. The most universally used items of equipment seem to be passed over here for lack of space. High spots of the intermediate class of equipment are treated here.

In the category of shop equipment, is a wide variety of machine tools, motors, motor generators, workbenches and other material of general application. For particular airport use there are a number of maintenance designs that have special aeromedical application. For cleaning engine parts, completed engines, wings, and other airplane parts, the Hyproclean Jetway has decreased the cleaning time in a number of repair shops. The device is a chemical vapor spray cleaning machine by which it is possible to spray a combination of heat, pressure, and cleaning compound to remove dirt and grease accumulations. A variety of chemical cleaning compounds for various purposes are on the market.

A number of airports have found use for oil refraction apparatus and where the airport activity is not sufficient to keep an oil garden busy, it is always possible to take an inventory work for grout and automobile service stations.

Mechanics

Air American Inc., Evanston, Ill.
L. L. N. T.

Air Technical Sales Company, catering supplies, 10 East 10th St., N. Y. C.

American Aircraft Equipment Company, 1041 Washington Blvd., Chicago, Ill.

John, Dave, 302 Chicago Chicago Chicago, 107 W. Jackson St., San Jose, Calif.

John Manufacturing Company, 1041 Chicago, 107 W. Jackson St., San Jose, Calif.

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